REMARKS

Claims 1, 3-12, and 14-18 are pending in the present application. Claims 2 and 13 have been cancelled. Claims 1, 7, 10, 11, and 12 are independent.

Applicant appreciates the Examiner's withdrawal of the previous art rejection. The following arguments address the newly discovered art and the rejections based thereon.

Art Rejections

Claims 1-5, 7, 8, and 10-17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakajima (USP 5,522,803) in view of Chraplyvy (USP 5,907,420). Claims 6 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakajima, Chraplyvy, and Miyachi (USP 5,920,414). These rejections, insofar as they pertain to the presently pending claims, are respectfully traversed.

Nakajima discloses an optical cross connect in which the intensity of the output signal is held constant despite the rerouting or failure of wavelengths passing through the routing portion 2. Nakajima accomplishes this purpose by utilizing dummy light sources such as dummy light sources 61, 64 shown in Fig. 1. A selector such as selector 411 may select between the dummy light source signal and the data wavelength. When a data wavelength is rerouted or fails, the selector will then choose the dummy light

source so as to maintain a constant number of output wavelengths output from the cross connect.

Nakajima clearly utilizes a routing management table to control the selectors and ultimately which dummy light source wavelengths are output from the cross connect. This is clear from column 6, lines 1-31. The routing management table keeps track of which data wavelengths are being used. A use condition field 205 is utilized for this purpose as shown in Fig. 2. As further discussed in column 8, lines 27-63 and particularly in lines 57-63, the use state field 205 of the routing table is used by the controller 51 to select whether the optical data signal or the dummy light signal should be propagated.

Thus, it is clear that Nakajima relies upon the routing table to control the selection of the dummy light sources signals. Furthermore, there is no power control of the dummy light source. This is discussed in column 9, lines 31-34 which states that the dummy light sources have the same optical power as the data wavelengths that they are replacing. In other words, a constant, preset signal power value is utilized for each of the dummy light sources. Thus, there is no measurement of optical signal power and no control of the dummy light source according to a measured optical power. These two concepts are interrelated, a fact which apparently is ignored by the Office Action.

Although the Office Action clearly admits that Nakajima fails to teach the claimed optical power monitors, the Chraplyvy patent is applied in a haphazard manner to modify Nakajima and thereby reject the claims. Applicant respectfully submits that this combination is improper and lacks motivation. The Office Action does allege motivation and states that Chraplyvy's disclosure of sensing optical power has the advantage of allowing the optical power input to all of the optical amplifiers to be maintained at a substantially constant level.

Although Chraplyvy does have as a primary object controlling the power level of the WDM signal to be substantially constant, this is merely an advantage of Chraplyvy's invention and does not serve as proper motivation to combine Chraplyvy with Nakajima. This is particularly true because Nakajima clearly teaches that the optical power level of the dummy light sources should be set to be the same optical power level as the optical signal that the dummy light source replaces. Recall also that the control exercised by Nakajima is based on a routing table which determines which wavelengths are active at each of the outputs such that a corresponding dummy light source can be selected or not. This is a substantially different purpose and theory of operation than that advanced by Chraplyvy. Thus, these patents are not combinable as the Office Action suggests.

Nakajima clearly depends upon a routing table and replacement of data wavelengths with dummy light sources having the same power level which is a theory of operation quite distinct from Chraplyvy who provides a feedback measurement of total optical signal power of the WDM signal and uses that total signal power measurement to adjust the output power level of the optical source 24. Merely restating Chraplyvy's advantage fails to provide motivation for combining these two disparate references.

To further emphasize the distinctions between the present invention and the combination of Nakajima and Chraplyvy, the claims have been amended. Generally speaking, the claim amendments clarify that the optical power monitors or corresponding method steps measure a respective spectral band power. This change emphasizes the banded nature of the optical device and method and the granular control of power on a band-by-band basis which are concepts completely absent from Nakajima and Chraplyvy, even when taken in combination.

More specifically, the combination of Nakajima and Chraplyvy fails to disclose or suggest a plurality of optical power monitors each of which being configured to measure a respective spectral band power on an associated one of the separate optical paths. Although Chraplyvy does measure optical power, this power measurement is clearly of the total WDM signal. This is a result of the architecture of the Chraplyvy invention which does not

contemplate banded optical signals or measurement of spectral band power in each of the respective optical bands. In stark contrast, Chraplyvy clearly measures the total signal power of the entire WDM signal as is clear from Fig. 1 where the tap 18 is of the entire WDM signal and not of a particular band.

Furthermore, the combination of Nakajima and Chraplyvy fails to disclose or suggest injecting a compensating wavelength at a power level sufficient for compensating for signal power changes for each respective band particularly in view of the other amended language of claim 1 which specifies that the power level of each idler laser is controlled according to the respective spectral band power on the associated one of the separate optical paths as measured by the associated one of the optical power monitors.

First of all, there is no spectral band power measurement in any of the applied art even when taken in combination. There is further no power level control based on such a spectral band power. Each of the claimed compensating wavelengths is controlled to have a power level that compensates for signal power changes in each respective band based on the spectral band power which is a concept completely absent from the combination advanced in the Office Action.

Still further, the structural arrangement recited in claim 1 further distinguishes the invention over the proposed combination. Specifically, the idler lasers are claimed as being downstream from

an associated optical power monitor thereby implying a feedforward type of structure wherein the element being controlled is downstream of the measurement element. Clearly, Chraplyvy is relied upon to teach the optical power measurement and optical power control. However, Chraplyvy clearly utilizes a feedback arrangement wherein the optical signal is injected upstream of where the measurement is performed. Thus, even if Chraplyvy's total WDM power measurement can somehow be seen as a band-by-band measurement (which it clearly is not), the feedback arrangement of Chraplyvy in which the wavelength is injected upstream of the power measurement teaches away from and does not disclose or suggest injecting a compensating wavelength at a point downstream from where the optical power monitors are provided.

Likewise, there are patentable distinctions between independent claim 7 and the combination of Nakajima and Chraplyvy, particularly in view of the amendments to claim 7. Specifically, the combination of art fails to disclose or suggest a plurality of optical power monitors each of which being configured to measure a respective spectral band power on an associated one of the separate optical paths. Similar to the arguments above, Chraplyvy's single power monitor for the entire WDM signal fails to disclose or suggest this claim element particularly because Chraplyvy clearly measures the entire power of the entire WDM signal and does not perform a spectral band power measurement on signals on respective

separate optical paths. Nakajima is not even relied upon to teach this feature and, indeed, the Office Action admits that power measurements are not performed by Nakajima. Thus, there is no evidence in the Office Action that teaches or suggests the claimed plural optical power monitors, particular as amended.

Still further, the combination of Nakajima and Chraplyvy fails to disclose or suggest that each of the compensating wavelengths being at a power level for compensating for signal power changes for each respective band on the associated one of the optical signal paths. This difference is further emphasized by the wherein clause added to claim 7 which specifies that wherein the power level of each of idler laser is controlled according to the respective spectral band power on the associated one of the separate optical paths as measured by the associated one of the optical power monitors. No such power level control, particularly based on a spectral band power measurement is disclosed or suggested by the combination of Nakajima and Chraplyvy.

With respect to method claim 10, the combination of art fails to disclose or suggest detecting a spectral band power associated with the at least one separate optical signal on each of the separate optical signal paths. Again, the power measurement performed by Chraplyvy is a total signal power of the entire WDM signal and does not disclose or suggest spectral band power measurements or detection on respective spectral bands. Nor does

the combination of art disclose or suggest the power level of each compensating wavelength being controlled according to the respective spectral band power on the associated one of the separate optical paths. No such power control based on spectral band power measurements is disclosed or suggested by Nakajima or Chraplyvy even when taken in combination.

With respect to independent claim 11, the applied art also fails to disclose or suggest detecting a spectral band power associated with each of the plurality of separate groups of separate signals on associated separate optical signal paths. Yet again, Chraplyvy's power measurement is not on a band basis and measures the total WDM signal power on a single path.

Still further, amended claim 11 recites a further distinction also not taught or suggested by the applied combination of art. Specifically, the applied art fails to disclose or suggest controlling a power level of each compensating wavelength according to the respective spectral band power detected for the associated band of separate signals on the associated separate optical signal path as recited in amended claim 11. No such power level control particularly according to respective spectral band power is disclosed or suggested by Nakajima or Chraplyvy, even when taken in combination.

With respect to independent claim 12, Nakajima and Chraplyvy also fail to disclose or suggest optical power monitors which is

optically coupled to one of the separate paths and monitoring a spectral band power of the corresponding data wavelengths being carried by the path being monitored. No such spectral band power measurement on a band-by-band basis is disclosed or suggested by Chraplyvy which is clearly the reference relied upon in the Office Action to teach this feature. Still further, the applied combination of art fails to disclose or suggest a control circuit providing feedforward control of the idler lasers based on the respective spectral band power of the corresponding band of data wavelengths. First, Chraplyvy's control is a feedback control not a feedforward control. Furthermore, Chraplyvy's control is of a single wavelength based on a total signal power of the total WDM signal and does not disclose or suggest band-by-band power control based on a spectral band power level.

Still further, amended claim 12 further recites another distinction not found or suggested in the applied combination. Particularly, the claimed control circuit provides feedforward control of the idler lasers based on the respective spectral band power of the corresponding band data wavelengths to maintain a desired and substantially constant spectral band power. Although Chraplyvy does have as a goal to maintain constant power, this constant is the total power of the entire WDM signal and does not disclose or suggest a constant spectral band power as claimed.

Returning to claim 7, a physical arrangement of the idler lasers and optical power monitors is also not disclosed or suggested by the applied combination. This structural arrangement arranges the idler lasers downstream from the associated optical power monitors which is entirely opposite of the feedback arrangement of Chraplyvy which locates the optical force laser at a point upstream of the tap 18 that taps the signal for measurement by the photodetector 20 as shown in Fig. 1.

This arrangement and distinction is further reflected in claim 10 wherein the injecting step injects a separate compensating wavelength at a location downstream from where the associated power level is detected. Again, Chraplyvy's feedback arrangement is quite the opposite of this arrangement. Likewise, the same distinction occurs in claim 11 wherein the step of injecting the compensating wavelength is at a location downstream from where the associated power level is detected. This is another distinction also present in claim 11 which is not disclosed or suggested by the applied combination, particularly in view of Chraplyvy which is relied upon to teach this feature but clearly shows a feedback arrangement which is opposite to the arrangement being claimed.

This structural arrangement is further reflected in independent claim 12 wherein the idler lasers are optically coupled at a location downstream from the respected power monitor. Again,

this feature is certainly not disclosed or suggested by the applied combination of art.

The above arguments point out certain features which are clearly lacking from the combination of Nakajima and Chraplyvy. Also, it has been demonstrated that motivation is lacking thereby making this combination improper and insufficient to reject the pending claims.

Moreover, Miyachi fails to remedy any of the noted deficiencies in the base combination of Nakajima and Chraplyvy. Indeed, Miyachi is merely relied upon to teach the features of dependent claims 6 and 9 which are not relied upon for patentability in this Reply. Furthermore, Applicant asserts that Miyachi also fails to disclose or suggest any of the features pointed out above with respect to each of the independent claims. Thus, the full combination of Nakajima, Chraplyvy and Miyachi fails to disclose or suggest at least the features of the independent claims.

For all of the above reasons, taken alone or in combination, Applicant respectfully requests reconsideration and withdrawal of the art rejections.

Allowable Subject Matter

Applicant appreciates the Examiner's indication that claim 18 would be allowed if rewritten in independent form including all of the features of the base claim and any intervening claims. For the reasons discussed above, Applicant believes that all pending claims are now in condition for allowance. Therefore, Applicant earnestly solicits a formal indication thereof in the form of a Notice of Allowance.

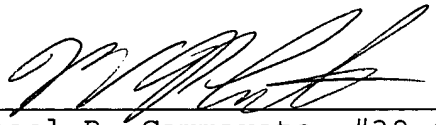
Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Michael R. Cammarata (Reg. No. 39,491) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 
Michael R. Cammarata, #39,491

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

MRC/kpc

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